NJDOT Bureau of Research
QUARTERLY PROGRESS REPORT

Project Title: **Implementation of Maintenance Decision Support System in New Jersey**	
RFP Number: NJDOT 2007-09	**NJDOT Research Project Manager:** Robert Sasor
Task Order Number/Study Number: TO-70	**Principal Investigator:** Chien, Steven I-Jy
Project Starting Date: 7/23/2007 **Original Project Ending Date:** 7/31/2009 **Modified Completion Date:**	**Period Starting Date:** 04/01/2008 **Period Ending Date:** 06/30/2008

Task	% of Total Budget	Total Budget	% of Task this quarter	Cost this quarter	% of Task to date	Cost To Date
Conduct a literature search of state-of-practice	2.63	$9,000	0	$0	100	$9,000
Conduct a Comprehensive and Focused Literature Review.	5.26	$18,000	0	$0	100	$18,000
Study the prototype of MDSS	15.79	$54,000	25	$13,500	60	$32,400
Technology Transfer	13.16	$45,000	25	$11,250	45	$20,250
Identify Studied Region and Investigate Existing Data Sources	15.79	$54,000	20	$10,800	38	$20,520
Study MDSS Forms for Database Development	7.02	$24,000	9	$2,160	17	$4,080
Data Collection	11.70	$40,000	0	$0	0	$0
Develop NJ-MDSS	17.54	$60,000	0	$0	0	$0
Presentation, Implementation, and Training	2.34	$8,000	0	$0	0	$0
Final Report	8.77	$30,000	0	$0	0	$0
TOTAL	100 %	$342,000		$37,710		$104,250

Project Objectives:

The objectives to developing a New Jersey specific MDSS database are to:

- Utilize and maximize the existing roadway, surface and weather forecasting data resources;
- Identify weaknesses and bolster or improve the accuracy and speed (real-time) of information gathering and dissemination;
- Combine data to create an open, integrated and understandable presentation of current environmental, atmospheric and roadway conditions;
- Process and query data to generate diagnostic and prognostic GIS mapping of road conditions along identified corridors;
- Predict future changes in roadway conditions to aid in resource management;
- Notify NJDOT of up-to-the-minute conditions and suggest optimal maintenance treatments for future changes in conditions;
- Interface with neighboring state MDSS (optional);
- Evaluate reliability of predictions and effectiveness of applied treatments

for specific road or weather conditions; and
- Provide year-end reports to include equipment, manpower, and resource usage, etc.

Project Abstract:

Managing winter maintenance activities is a fairly complex endeavor. Maintenance supervisors must know the regulations about chemical applications and environmental impacts and be able to analyze and make sense of multiple and often contradictory weather forecasts. In addition, many maintenance supervisors also are faced with tight budgets. This is further complicated by the need to obtain salting and plowing services from outside contractors. All of these factors challenge public agencies to meet the traveling public's high expectation that roads be kept free of snow and ice. Therefore, it is desirable that today's maintenance supervisors have the ability to efficiently handle multiple tasks and process high volumes of information in adverse winter weather conditions.

The research team is proposing a pilot study in developing and implementing NJ-MDSS for NJDOT, within which state-of-the-art weather forecasting and data fusion techniques will merge with computerized winter road maintenance rules of practice, such that consolidated weather forecasting, specific current and future roadway and bridge deck condition information, and treatments and timeline applications can be well taken. Optimally, the proposed NJ-MDSS will allow NJDOT to make informed decisions based on accurate information, mainly collected by state-funded surface transportation related sensors (e.g., Clarus (RWIS)), which will ultimately lead to a higher level of service and reduced weather-related congestion delay and accidents, as well as reduced redundancy and environmental/ecological impacts; more efficient use of manpower, contractor services, fleet and asset management; and increased accountability resulting in more prudent and efficient spending. The outcome of the proposed NJ-MDSS will be a set of guidelines aimed at maintenance supervisors that provides a precise forecast of surface conditions and treatment recommendations customized for selected roadways in New Jersey. With the developing weather conditions and the availability of chemicals and manpower/vehicles NJ-MDSS would issue tickets with location information (road and mile post) for winter treatment. The long-term objective would be to fully automate the system after several trials over a couple of years.

1.Progress this quarter by task:

- continuously test MDSS v5
- Preparing/Acquiring weather data from NOAA through MIDAS
- purchased computer equipment/server for the prototype MDSS

2. Proposed activities for next quarter by task:

- attend Clarus & MDSS stakeholder meeting 8/4~8/9
- collect weather data from NOAA through MIDAS
- Design database for data files used in MDSS
- Develop program to input configuration information to database and generate configuration files
- Collect road pavement information and weather station location information
- Convert NJWxnet data into netCDF format
- Investigate data transfer protocol between Rutgers U. and NJIT

3. List of deliverables provided in this quarter by task (product date):

none yet

4. Progress on implementation and training activities:

none yet

5. Problems/proposed solutions:

none

6. Budget summary:

Total Project Budget	$342,000
Modified Contract Amount	$0.00
Funding Award to Date	$180,000
Total Project Expenditure to date	$104,250
% of Total Project Budget Expended	30.48 %
% of Total Project Completed	30.48 %

NJDOT Research Project Manager Concurrence: _____ **Date:** _____